

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
22 January 2004 (22.01.2004)

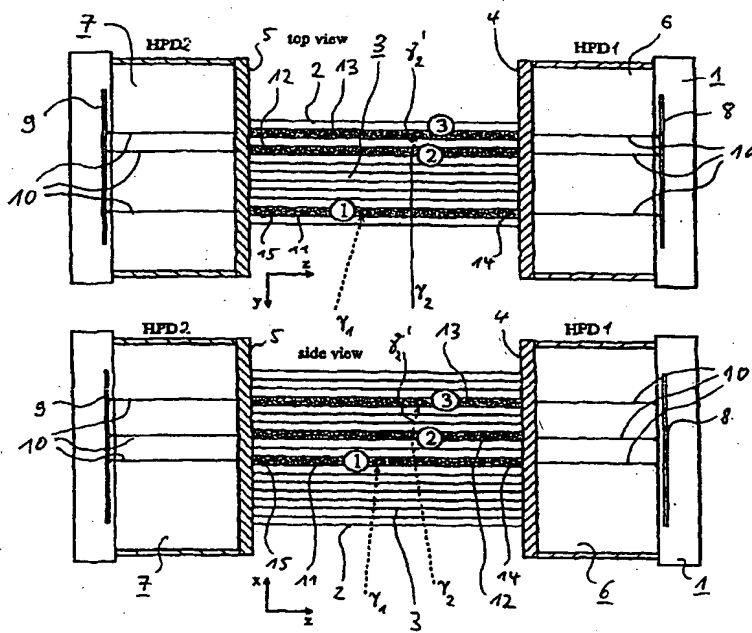
PCT

(10) International Publication Number
WO 2004/008177 A1

- (51) International Patent Classification⁷: **G01T 1/29** (74) Agent: **WEBER-BRULS, Dorothée**; Boehmert & Boehmert, Freiherr-vom-Stein-Strasse 7, 60323 Frankfurt (DE).
- (21) International Application Number: **PCT/EP2002/007967**
- (22) International Filing Date: **17 July 2002 (17.07.2002)** (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (71) Applicant (*for all designated States except US*): **EUROPEAN ORGANISATION FOR NUCLEAR RESEARCH - CERN [CH/CH]; CH-1211 Geneva (CH).**
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): **JORAM, Christian [DE/FR]; 14, impasse des corneillettes, F-01170 Crozet (FR). SEGUINOT, Jaques [FR/FR]; 998, rue du creux du loup, F-01170 Gex (FR). WEILHAMMER, Peter [DE/CH]; 33, chemin des Vignes, CH-1291 Commugny (CH).**
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: **GAMMA RAY DETECTOR FOR POSITRON EMISSION TOMOGRAPHY (PET) AND SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY (SPECT)**



(57) Abstract: The invention relates to a detector module (1) for a Positron Emission Tomograph (PET) and for Single Photon Emission Computed Tomography (SPECT) comprising a matrix (3) of scintillator crystals, said matrix having a first side and a second side opposite to said first side, each scintillator crystal having a first end (14) and a second end (15), said scintillator crystals (2) being oriented parallel to each other, whereby said first end (14) and said second end (15) of each of said scintillator crystals (2) coincide with said first side and said second side of said matrix (3), respectively; a first light sensitive detector (6) producing an electrical signal proportional to the amount of light detected, being optically connected to said first side of said matrix (3), said first light sensitive detector (6) being position sensitive; and a second light sensitive detector (7) producing electrical signal proportional to the amount of light detected, said second light sensitive detector (7) being optically connected to said second side of said matrix (3),

wherein said second light sensitive detector (7) is positioned sensitive. Using said detector module (1) a method to determine the 3D-coordinates of a point of interaction of a gamma quantum (γ_1 , γ_2) with said detector module (1) is disclosed method. This allows to use signals from compton scattered γ 's to enhance the sensitivity of a Positron Emission Tomograph scanner provided being composed of said detection modules (1) without parallax errors.